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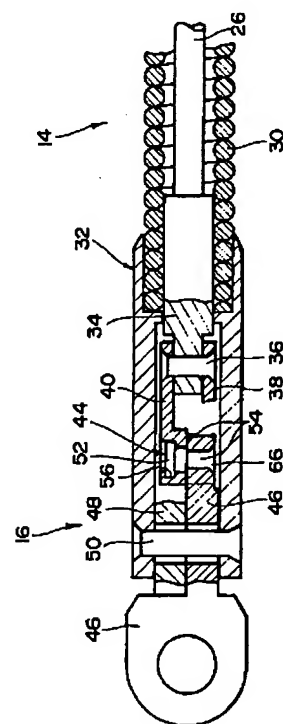
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(54)【発明の名称】内視鏡用処置具

(57)【要約】

【課題】本発明は、ピン44の端部にD字状のフランジ52を形成し、このフランジ52をリンク40に形成された凹状溝56に係合させることにより、折れたピン44がリンク40から脱落することを防止する内視鏡用処置具を提供する。

【解決手段】生検鉗子10の鉗子部16に配設された鉗子片46とリンク40は、ピン44により回動自在に連結される。ピン44は、軸部54と該軸部54の端部に設けられたフランジ52とから構成される。フランジ52は、D字状に形成され、リンク40に形成した凹溝56に係合される。また、ピン44は、かしめ加工によりフランジ52の他端部が塑性変形され、かしめ部66が形成される。



【特許請求の範囲】

【請求項 1】挿入部先端に軸支された一对の鉗子片と、該一对の鉗子片の後端に軸支された一对のリンクと、該一对のリンクの後端に軸支されたスライダと、を備え、手元操作部を操作して前記スライダを前後動させ、前記一对の鉗子片を開閉させる内視鏡用処置具において、前記鉗子片の後端と前記リンクとはピンを介して軸支されると共に、該ピンの頭部は異形に形成されて、前記リンクの連結孔からの脱落防止構造に形成されていることを特徴とする内視鏡用処置具。

【請求項 2】前記ピンの頭部は、D 字状に形成されたフランジであることを特徴とする請求項 1 記載の内視鏡用処置具。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、内視鏡の鉗子孔から挿入されて使用される生検鉗子、把持鉗子等の内視鏡用処置具に関する。

【0002】

【従来の技術】生検鉗子、把持鉗子等の鉗子は、内視鏡の鉗子孔から挿入されて使用され、鉗子の手元操作部を操作することにより、一对の鉗子片が開閉操作される。この鉗子片は、複数のリンクからなるリンク機構によって開閉動作される。

【0003】

【発明が解決しようとする課題】このような鉗子は、リンク機構の動作を繰り返すと、リンク機構のリンクを連結しているピンが磨耗して折れる場合があるが、従来の鉗子は、折れたピンが被検者の体内に脱落するおそれがあった。本発明はこのような事情に鑑みてなされたもので、リンク機構の折れたピンがリンクから脱落するのを防止することができる内視鏡用処置具を提供することを目的とする。

【0004】

【課題を解決するための手段】本発明は前記目的を達成するために、挿入部先端に軸支された一对の鉗子片と、該一对の鉗子片の後端に軸支された一对のリンクと、該一对のリンクの後端に軸支されたスライダと、を備え、手元操作部を操作して前記スライダを前後動させ、前記一对の鉗子片を開閉させる内視鏡用処置具において、前記鉗子片の後端と前記リンクとはピンを介して軸支されると共に、該ピンの頭部は異形に形成されて、前記リンクの連結孔からの脱落防止構造に形成されていることを特徴とする。

【0005】本発明によれば、前記鉗子片とリンクとを連結するピンは、頭部が異形に形成され、前記リンクの連結孔からの脱落防止構造が構成されているので、ピンが折れた場合であっても、折れたピンはリンクから脱落しない。

【0006】

【発明の実施の形態】以下添付図面に従って本発明に係る内視鏡用処置具の好ましい実施の形態について詳説する。図 1 は、本発明の内視鏡用処置具が適用された生検鉗子 10 の正面図である。同図に示す生検鉗子 10 は、術者が操作時に使用する手元操作部 12、内視鏡の鉗子孔等に挿入される挿入部 14、及び鉗子部（先端部）16 から構成されている。

【0007】前記手元操作部 12 には軸状体 18 が設けられ、この軸状体 18 は、筒状に形成された操作子 20 に摺動自在に挿入されている。前記操作子 20 の、上下端部にはフランジ 22、24 が形成されており、前記操作子 20 の内部には、半径方向にビス（図示せず）が設けられ、このビスは軸状体 18 内に摺動自在に配置されたスライダ（図示せず）にねじ込まれている。これによって、操作子 20 とスライダとが一体に連結されている。前記スライダには、操作ワイヤ 26 の基端部が固定され、この操作ワイヤ 26 の先端部は鉗子部 16 に連結されている。

【0008】前記軸状体 18 の上端部には、リング状の指掛け部 28 が形成されている。この指掛け部 28 には、操作時において、術者の親指が挿通され、この状態で人差し指と中指を操作子 20 のフランジ 22 とフランジ 24 との間に挿入した後、操作子 20 が押し引き操作されるようになっている。操作子 20 が操作されると、前記スライダ及び操作ワイヤ 26 を介して連結された前記鉗子部 16 が作動される。

【0009】前記手元操作部 12 は、その外周部が可撓性を有する密着コイルばね 30 で形成されている。この密着コイルばね 30 の基端部は、前記軸状体 18 の下端部に固着されている。密着コイルばね 30 の内部には、前記操作ワイヤ 26 が挿通され、密着コイルばね 30 の先端部は、鉗子部 16 を構成する略筒状に形成された鉗子部本体 32 に接合されている。

【0010】前記鉗子部 16 は図 2 及び図 3 に示すように、操作ワイヤ 26 の先端部に連結されるスライダ 34 を備え、このスライダ 34 にはピン 36 を介してリンク 38、40 が回動自在に支持されている。このリンク 38、40 の他端には略くの字状に形成された鉗子片 46、48 がピン 42、44 を介して連結されている。前記鉗子片 46、48 は、その重なり部において、軸 50 を介して鉗子部本体 32 に軸支されている。したがって、前記鉗子部 16 の鉗子片 46、48 は、図 1 の操作子 20 が上下移動され、操作ワイヤ 26 が押し込み、又は引き込み操作されることにより、ピン 50 を中心に互いに逆方向に回動され、開閉操作される。

【0011】前記ピン 44 は、図 4 及び図 5 に示すように、軸部 54 と、該軸部 54 の端部に設けられたフランジ 52 から構成され、この軸部 54 が、リンク 40 に形成された連結孔 58、及び鉗子片 46 に形成された連結孔 60 に挿入される。軸部 54 の外周面には、段差部 6

2 が設けられ、この段差部 6 2 が鉗子片 4 6 に当接される。また、前記ピン 4 4 のフランジ 5 2 は、円形を一部切り欠いた D 字状に形成されている。

【0012】一方、リンク 4 0 に形成された連結孔 5 8 は、前記フランジ 5 2 が当接される円形の座 6 4 が形成されている。この円形の座 6 4 は、前記フランジ 5 2 が挿入される D 字状の開口部に連通されている。これにより、リンク 4 0 に、前記フランジ 5 2 の円弧部が係合される凹状溝 5 6 が形成される。このように形成されたピン 4 4 及びリンク 4 0 は、ピン 4 4 のフランジ 5 2 を、前記リンク 4 0 の D 字状の開口部に合わせながら、ピン 4 4 の軸部 5 4 をリンク 4 0 の連結孔 5 8、鉗子片 4 6 の連結孔 6 0 に挿入し、フランジ 5 2 を座 6 4 に当接させる。そして、ピン 4 4 を回動させて、フランジ 5 2 の円弧部を凹状溝 5 6 に係合させ、この状態でピン 4 4 をかしめる。これにより、ピン 4 4 はフランジ 5 2 と反対側の端部が変形されて、図 4 のかしめ部 6 6 が形成され、リンク 4 0 と鉗子片 4 6 がピン 4 4 により連結される。

【0013】以上はリンク 4 0 と鉗子片 4 6 との連結構造の説明であるが、リンク 3 8 と鉗子片 4 8 との連結構造も同様に構成され、ピン 4 2 に D 字状のフランジが、また、リンク 3 8 に凹状溝が形成される。次に上記の如く構成された生検鉗子 1 0 の作用について説明する。生検鉗子 1 0 は、操作子 2 0 が操作されると、操作子 2 0 に操作ワイヤ 2 6 を介して連結されたリンク 3 8、4 0 及び鉗子片 4 6、4 8 がピン 4 2、4 4 を介して回動され、前記鉗子片 4 6、4 8 が開閉される。したがって、鉗子片 4 6、4 8 が開閉操作されるとピン 4 4 が磨耗され、ピン 4 4 の軸部 5 4 が折れることがある。折れたピン 4 4 のかしめ部 6 6 側は、かしめ部 6 6 が鉗子片 4 6 に密着されているので、鉗子片 4 6 から脱落しない。一方、折れたピンのフランジ 5 2 側は、フランジ 5 2 がリンク 4 0 の凹状溝 5 6 に係合されているので、鉗子片 4 6 から脱落しない。

【0014】このように本実施の形態の生検鉗子 1 0 は、ピン 4 4 の一端部に D 字状のフランジ 5 2 を形成し、このフランジ 5 2 をリンク 4 0 に形成した凹状溝 5 6 に係合し、さらにピン 4 4 の他端部にかしめ部 6 6 を形成したので、折れたピン 4 4 がリンク 4 0 や鉗子片 4 6 から脱落することを防止することができる。なお、上述した実施の形態では生検鉗子 1 0 を例示したが、これに限られるものではなく、ピンにより回動自在に連結されるリンクが用いられる内視鏡用処置具であれば適用することができる。

【0015】また、上述した実施の形態では、ピン 4 4 の一端部に D 字状のフランジ 5 2 を形成したがこれに限定するものではなく、リンク 4 0 からの脱落を防止できる構造であればよい。また、本実施例では、ピン 4 4 の他端部をかしめたがこれに限定するものではなく、前記他端部にも脱落防止用の係合部を設けて鉗子片 4 6 に係合させたり、溶着や接合等により鉗子片 4 6 に取り付けてもよい。

【0016】

【発明の効果】以上説明したように本発明の内視鏡用処置具によれば、鉗子片とリンクとを連結するピンは、頭部が異形に形成され、前記リンクの連結孔からの脱落防止構造が構成されているので、折れたピンの脱落を防止することができ、内視鏡用処置具の安全性を向上させることができる。

【図面の簡単な説明】

【図 1】本実施の形態の生検鉗子の全体図

【図 2】図 1 に示した生検鉗子の鉗子部の縦断面図

【図 3】図 2 に示した鉗子部の 3-3 線に沿う断面図

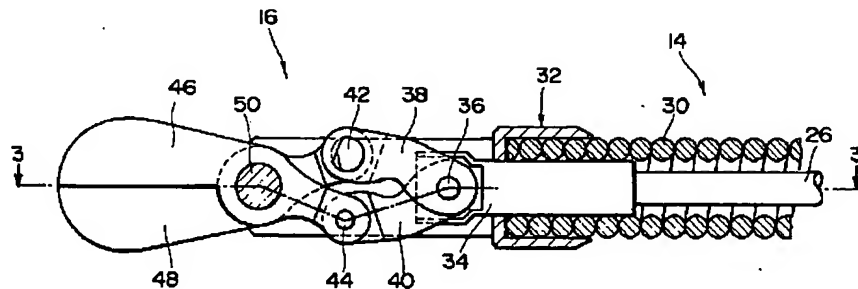
【図 4】図 3 に示した鉗子部の部分拡大図

【図 5】本発明の要部を示す斜視図

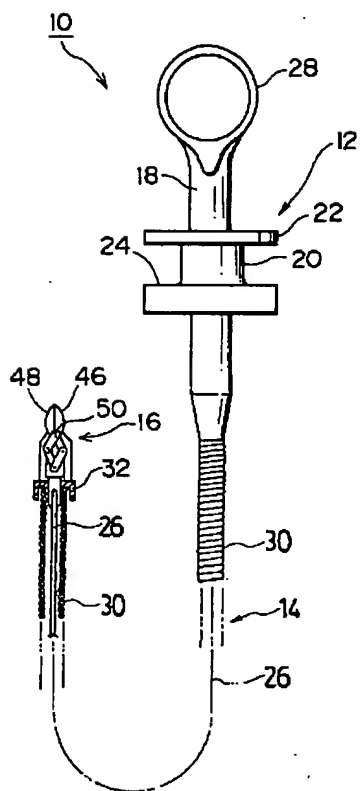
【符号の説明】

10…生検鉗子、16…鉗子部、38…リンク、40…リンク、42…ピン、44…ピン、46…鉗子片、48…鉗子片、52…フランジ、54…軸部、56…凹状溝

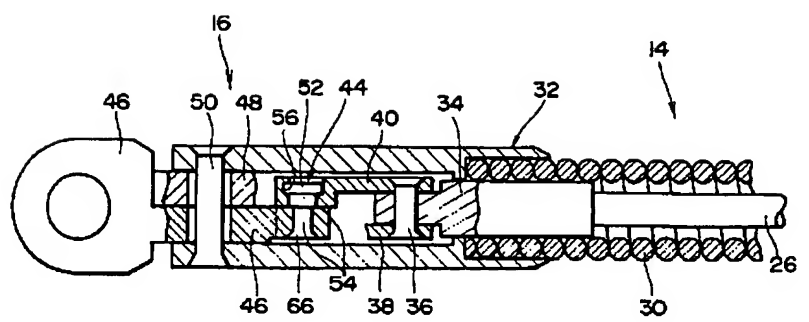
【図 2】



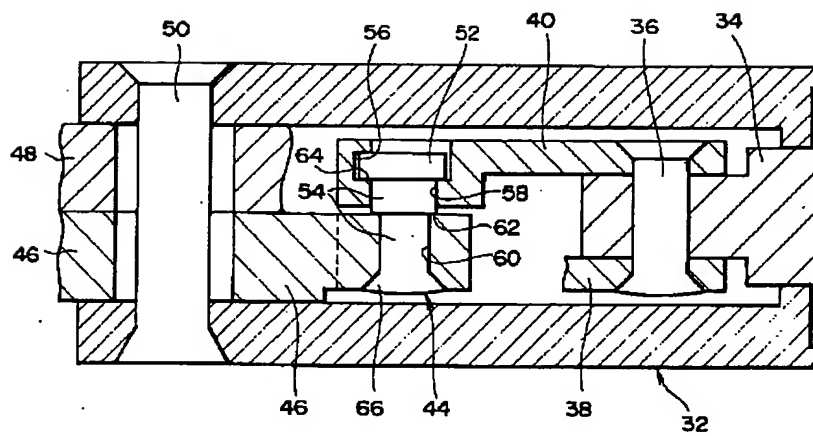
【図1】



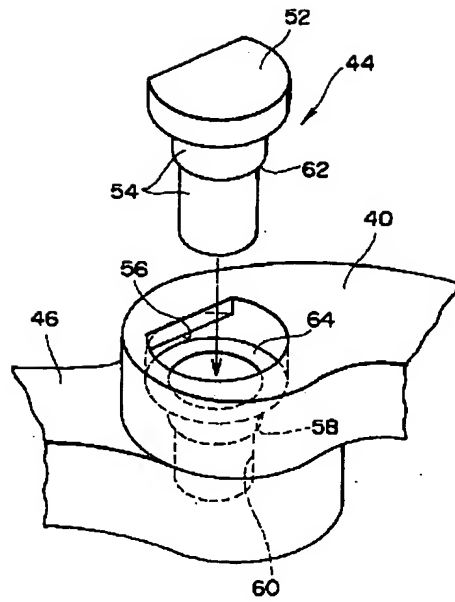
【図3】



【図4】



【図 5】



PATENT ABSTRACTS OF JAPAN

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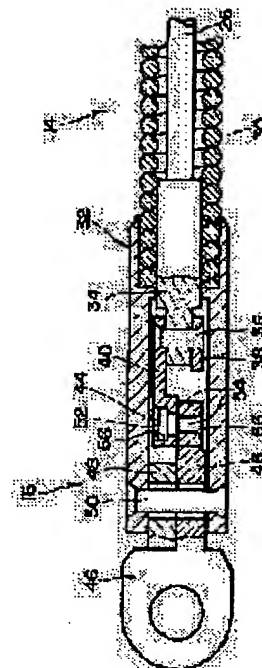
(72)Inventor : MACHIDA MITSUNORI

(54) ENDOSCOPE TREATMENT IMPLEMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an endoscope treatment implement for preventing a broken pin from coming off from a link by forming a D shape flange in the end part of the pin and engaging the flange with a recessed groove formed in the link.

SOLUTION: Forceps piece 46 and the link 40 arranged in the forceps part 16 of biopsy forceps are connected by the pin 44 so as to be freely rotatable. The pin 44 is constituted of a shaft part 54 and the flange 52 disposed in the end part of the shaft part 54. The flange 52 is formed to be a D shape and engaged with the recessed groove 56 formed in the link 4. Besides, in the pin 44, the other end part of the flange 52 is plastically deformed by a calking work and a calking part 66 is formed.



LEGAL STATUS

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[Date of requesting appeal against examiner's decision of rejection]

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CLAIMS

[Claim(s)]

[Claim 1] The link of the couple supported to revolve by the back end of the piece of forceps of the couple supported to revolve at the nose of cam of the insertion section, and the piece of forceps of this couple, In the disposal implement for endoscopes which it has the slider supported to revolve by the back end of the link of this couple, and a hand control unit is operated [implement], carries out longitudinal slide movement of the aforementioned slider, and makes the piece of forceps of the aforementioned couple open and close The back end and the aforementioned link of the aforementioned piece of forceps are a disposal implement for endoscopes characterized by forming the head of this pin in an anomaly while being supported to revolve through a pin, and being formed in defluxion prevention structure from the communicating pore of the aforementioned link.

[Claim 2] The head of the aforementioned pin is a disposal implement for endoscopes according to claim 1 characterized by being the flange formed in the shape of D character.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention — the forceps of an endoscope — it is related with disposal implements for endoscopes used from a hole, being inserted, such as a bioptome and grasping forceps

[0002]

[Description of the Prior Art] forceps, such as a bioptome and grasping forceps, — the forceps of an endoscope — it is used from a hole, being inserted and switching operation of the piece of forceps of a couple is carried out by operating the hand control unit of forceps Switching action of this piece of forceps is carried out by the link mechanism which consists of two or more links.

[0003]

[Problem(s) to be Solved by the Invention] If such forceps repeat operation of a link mechanism, although the pin which has connected the link of a link mechanism may wear out and break, the conventional forceps had a possibility that the pin which broke might be omitted in the coelome of the subject. this invention was made in view of such a situation, and aims at the pin with which the link mechanism broke offering the disposal implement for endoscopes which can prevent dropping out of a link.

[0004]

[Means for Solving the Problem] The piece of forceps of the couple supported to revolve at the nose of cam of the insertion section in order that this invention might attain the aforementioned purpose, In the disposal implement for endoscopes which it has the slider supported to revolve by the back end of the link of the couple supported to revolve by the back end of the piece of forceps of this couple, and the link of this couple, and a hand control unit is operated [implement], carries out longitudinal slide movement of the aforementioned slider, and makes the piece of forceps of the aforementioned couple open and close The back end and the aforementioned link of the aforementioned piece of forceps are characterized by forming the head of this pin in an anomaly and forming it in defluxion prevention structure from the communicating pore of the aforementioned link while they are supported to revolve through a pin.

[0005] According to this invention, the pin with which it broke even if the pin which connects the aforementioned piece of forceps and a link was the case where a pin broke, since the head was formed in the anomaly and the defluxion prevention structure from the communicating pore of the aforementioned link was constituted is not omitted from a link.

[0006]

[Embodiments of the Invention] It explains in full detail about the gestalt of desirable operation of the disposal implement for endoscopes which starts this invention according to an accompanying drawing below. Drawing 1 is the front view of the bioptome 10 with which the disposal implement for endoscopes of this invention was applied. the forceps of the hand control unit 12 and endoscope with which a way person uses the bioptome 10 shown in this drawing at the time of operation — it consists of the insertion section 14 inserted in a hole etc., and the

forceps section (point) 16

[0007] A stem 18 is formed in the aforementioned hand control unit 12, and this stem 18 is inserted in the handler 20 formed in tubed free [sliding]. Flanges 22 and 24 are formed in the vertical edge of the aforementioned handler 20, inside the aforementioned handler 20, a screw (not shown) is prepared in radial, and this screw is thrust into the slider (not shown) arranged free [sliding in a stem 18]. The handler 20 and the slider are connected with one by this. The end face section of the operation wire 26 is fixed to the aforementioned slider, and the point of this operation wire 26 is connected with the forceps section 16.

[0008] The ring-like fingerplate section 28 is formed in the upper-limit section of the aforementioned stem 18. After inserting in a way person's thumb at the time of operation and inserting ***** and the middle finger between the flange 22 of a handler 20, and a flange 24 in this state, a handler 20 pushes and length operation is carried out at this fingerplate section 28. Operation of a handler 20 operates the aforementioned forceps section 16 connected through the aforementioned slider and the operation wire 26.

[0009] The aforementioned hand control unit 12 is formed with the adhesion coiled spring 30 with which the periphery section has flexibility. The end face section of this adhesion coiled spring 30 has fixed in the soffit section of the aforementioned stem 18. The aforementioned operation wire 26 is inserted in the interior of the adhesion coiled spring 30, and the point of the adhesion coiled spring 30 is joined to the forceps section main part 32 formed in the abbreviation tubed which constitutes the forceps section 16.

[0010] As the aforementioned forceps section 16 is shown in drawing 2 and drawing 3, it has the slider 34 connected with the point of the operation wire 26, and links 38 and 40 are supported by this slider 34 free [rotation] through the pin 36. The pieces 46 and 48 of forceps formed in rough-elbowed are connected with the other end of these links 38 and 40 through pins 42 and 44. The aforementioned pieces 46 and 48 of forceps are supported to revolve by the forceps section main part 32 through the shaft 50 in the lap section. Therefore, switching operation of the pieces 46 and 48 of forceps of the aforementioned forceps section 16 is mutually rotated and carried out to an opposite direction a center [a pin 50] by carrying out vertical movement of the handler 20 of drawing 1, and the operation wire's 26 pushing in or drawing-in operation being carried out.

[0011] As shown in drawing 4 and drawing 5, the aforementioned pin 44 consists of flanges 52 prepared in the shank 54 and the edge of this shank 54, and is inserted in the communicating pore 58 by which this shank 54 was formed in the link 40, and the communicating pore 60 formed in the piece 46 of forceps. The level difference section 62 is formed in the peripheral face of a shank 54, and this level difference section 62 is contacted by the piece 46 of forceps. Moreover, the flange 52 of the aforementioned pin 44 is formed in the shape of [which cut and lacked a part of round shape] D character.

[0012] On the other hand, as for the communicating pore 58 formed in the link 40, the circular seat 64 by which the aforementioned flange 52 is contacted is formed. This circular seat 64 is opened for free passage by opening of the shape of D character in which the aforementioned flange 52 is inserted. Thereby, the concave slot 56 where the radii section of the aforementioned flange 52 is engaged is formed in a link 40. Thus, doubling the flange 52 of a pin 44 with opening of the shape of D character of the aforementioned link 40, the pin 44 and link 40 which were formed insert the shank 54 of a pin 44 in the communicating pore 58 of a link 40, and the communicating pore 60 of the piece 46 of forceps, and make a flange 52 contact a seat 64. And rotate a pin 44, the radii section of a flange 52 is made to engage with the concave slot 56, and a pin 44 is closed in this state. Thereby, a flange 52 and the edge of an opposite side are deformed by the pin 44, the caulking section 66 of drawing 4 is formed, and the piece 46 of forceps is connected with a link 40 by the pin 44.

[0013] Although the above is explanation of the connection structure of a link 40 and the piece 46 of forceps, the connection structure of a link 38 and the piece 48 of forceps is constituted similarly, a D character-like flange is formed in a pin 42, and a concave slot is formed in a link 38. Next, an operation of the constituted bioptome 10 is explained like the above. The links 38 and 40 where the bioptome 10 was connected with the handler 20 through the operation wire 26

when the handler 20 was operated, and the pieces 46 and 48 of forceps rotate through pins 42 and 44, and the aforementioned pieces 46 and 48 of forceps are opened and closed. Therefore, when switching operation of the pieces 46 and 48 of forceps is carried out, a pin 44 may be worn out and the shank 54 of a pin 44 may break. Since the caulking section 66 side of the pin 44 which broke is stuck to the caulking section 66 by the piece 46 of forceps, it does not drop out of the piece 46 of forceps. On the other hand, since the flange 52 is engaging with the concave slot 56 of a link 40, the flange 52 side of the pin which broke does not drop out of the piece 46 of forceps.

[0014] Thus, since the bioprobe 10 of the gestalt of this operation engaged with the concave slot 56 which formed the D character-like flange 52 in the end section of a pin 44, and formed this flange 52 in the link 40 and formed the caulking section 66 in the other end of a pin 44 further, it can prevent that the pin 44 which broke is omitted from a link 40 or the piece 46 of forceps. In addition, although the bioprobe 10 was illustrated with the gestalt of operation mentioned above, it is not restricted to this, and it is applicable if it is the disposal implement for endoscopes with which the link connected free [rotation] by the pin is used.

[0015] Moreover, what is necessary is just the structure where it does not limit to this with the gestalt of operation mentioned above although the D character-like flange 52 is formed in the end section of a pin 44, and defluxion from a link 40 can be prevented. Moreover, in this example, although the other end of a pin 44 is closed, it does not limit to this, the engagement section for defluxion prevention is prepared also in the aforementioned other end, and it may be made to engage with the piece 46 of forceps, or you may attach in the piece 46 of forceps by welding, junction, etc.

[0016]

[Effect of the Invention] According to the disposal implement for endoscopes of this invention, as explained above, since a head is formed in an anomaly and the defluxion prevention structure from the communicating pore of the aforementioned link is constituted, the pin which connects the piece of forceps and a link can prevent defluxion of the pin which broke, and can raise the safety of the disposal implement for endoscopes.

[Translation done.]

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TECHNICAL FIELD

[The technical field to which invention belongs] this invention — the forceps of an endoscope — it is related with disposal implements for endoscopes used from a hole, being inserted, such as a bioptome and grasping forceps

[Translation done.]

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PRIOR ART

[Description of the Prior Art] forceps, such as a bioptome and grasping forceps, — the forceps of an endoscope — it is used from a hole, being inserted and switching operation of the piece of forceps of a couple is carried out by operating the hand control unit of forceps. Switching action of this piece of forceps is carried out by the link mechanism which consists of two or more links.

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EFFECT OF THE INVENTION

[Effect of the Invention] According to the disposal implement for endoscopes of this invention, as explained above, since a head is formed in an anomaly and the omission prevention structure from the communicating pore of the aforementioned link is constituted, the pin which connects the piece of forceps and a link can prevent omission of the pin which broke, and can raise the safety of the disposal implement for endoscopes.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] If such forceps repeat operation of a link mechanism, although the pin which has connected the link of a link mechanism may wear out and break, the conventional forceps had a possibility that the pin which broke might be omitted in a **ed person's coelome. this invention was made in view of such a situation, and aims at the pin with which the link mechanism broke offering the disposal implement for endoscopes which can prevent dropping out of a link.

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MEANS

[Means for Solving the Problem] The piece of forceps of the couple supported to revolve at the nose of cam of the insertion section in order that this invention might attain the aforementioned purpose, In the disposal implement for endoscopes which it has the slider supported to revolve by the back end of the link of the couple supported to revolve by the back end of the piece of forceps of this couple, and the link of this couple, and a hand control unit is operated [implement], carries out longitudinal slide movement of the aforementioned slider, and makes the piece of forceps of the aforementioned couple open and close The back end and the aforementioned link of the aforementioned piece of forceps are characterized by forming the head of this pin in an anomaly and forming it in defluxion prevention structure from the communicating pore of the aforementioned link while they are supported to revolve through a pin.

[0005] According to this invention, the pin with which it broke even if the pin which connects the aforementioned piece of forceps and a link was the case where a pin broke, since the head was formed in the anomaly and the defluxion prevention structure from the communicating pore of the aforementioned link was constituted is not omitted from a link.

[0006]

[Embodiments of the Invention] It explains in full detail about the gestalt of desirable operation of the disposal implement for endoscopes which starts this invention according to an accompanying drawing below. Drawing 1 is the front view of the bioptome 10 with which the disposal implement for endoscopes of this invention was applied. the forceps of the hand control unit 12 and endoscope with which a way person uses the bioptome 10 shown in this drawing at the time of operation — it consists of the insertion section 14 inserted in a hole etc., and the forceps section (point) 16

[0007] A stem 18 is formed in the aforementioned hand control unit 12, and this stem 18 is inserted in the handler 20 formed in tubed free [sliding]. Flanges 22 and 24 are formed in the vertical edge of the aforementioned handler 20, inside the aforementioned handler 20, a screw (not shown) is prepared in radial, and this screw is thrust into the slider (not shown) arranged free [sliding in a stem 18]. The handler 20 and the slider are connected with one by this. The end face section of the operation wire 26 is fixed to the aforementioned slider, and the point of this operation wire 26 is connected with the forceps section 16.

[0008] The ring-like fingerplate section 28 is formed in the upper-limit section of the aforementioned stem 18. After inserting in a way person's thumb at the time of operation and inserting ***** and the middle finger between the flange 22 of a handler 20, and a flange 24 in this state, a handler 20 pushes and length operation is carried out at this fingerplate section 28. Operation of a handler 20 operates the aforementioned forceps section 16 connected through the aforementioned slider and the operation wire 26.

[0009] The aforementioned hand control unit 12 is formed with the adhesion coiled spring 30 with which the periphery section has flexibility. The end face section of this adhesion coiled spring 30 has fixed in the soffit section of the aforementioned stem 18. The aforementioned operation wire 26 is inserted in the interior of the adhesion coiled spring 30, and the point of the adhesion coiled spring 30 is joined to the forceps section main part 32 formed in the abbreviation

tubed which constitutes the forceps section 16.

[0010] As the aforementioned forceps section 16 is shown in drawing 2 and drawing 3, it has the slider 34 connected with the point of the operation wire 26, and links 38 and 40 are supported by this slider 34 free [rotation] through the pin 36. The pieces 46 and 48 of forceps formed in rough-elbowed are connected with the other end of these links 38 and 40 through pins 42 and 44. The aforementioned pieces 46 and 48 of forceps are supported to revolve by the forceps section main part 32 through the shaft 50 in the lap section. Therefore, switching operation of the pieces 46 and 48 of forceps of the aforementioned forceps section 16 is mutually rotated and carried out to an opposite direction a center [a pin 50] by carrying out vertical movement of the handler 20 of drawing 1, and the operation wire's 26 pushing in or drawing-in operation being carried out.

[0011] As shown in drawing 4 and drawing 5, the aforementioned pin 44 consists of flanges 52 prepared in the shank 54 and the edge of this shank 54, and is inserted in the communicating pore 58 by which this shank 54 was formed in the link 40, and the communicating pore 60 formed in the piece 46 of forceps. The level difference section 62 is formed in the peripheral face of a shank 54, and this level difference section 62 is contacted by the piece 46 of forceps. Moreover, the flange 52 of the aforementioned pin 44 is formed in the shape of [which cut and lacked a part of round shape] D character.

[0012] On the other hand, as for the communicating pore 58 formed in the link 40, the circular seat 64 by which the aforementioned flange 52 is contacted is formed. This circular seat 64 is opened for free passage by opening of the shape of D character in which the aforementioned flange 52 is inserted. Thereby, the concave slot 56 where the radii section of the aforementioned flange 52 is engaged is formed in a link 40. Thus, doubling the flange 52 of a pin 44 with opening of the shape of D character of the aforementioned link 40, the pin 44 and link 40 which were formed insert the shank 54 of a pin 44 in the communicating pore 58 of a link 40, and the communicating pore 60 of the piece 46 of forceps, and make a flange 52 contact a seat 64. And rotate a pin 44, the radii section of a flange 52 is made to engage with the concave slot 56, and a pin 44 is closed in this state. Thereby, a flange 52 and the edge of an opposite side are deformed by the pin 44, the caulking section 66 of drawing 4 is formed, and the piece 46 of forceps is connected with a link 40 by the pin 44.

[0013] Although the above is explanation of the connection structure of a link 40 and the piece 46 of forceps, the connection structure of a link 38 and the piece 48 of forceps is constituted similarly, a D character-like flange is formed in a pin 42, and a concave slot is formed in a link 38. Next, an operation of the constituted bioptome 10 is explained like the above. The links 38 and 40 where the bioptome 10 was connected with the handler 20 through the operation wire 26 when the handler 20 was operated, and the pieces 46 and 48 of forceps rotate through pins 42 and 44, and the aforementioned pieces 46 and 48 of forceps are opened and closed. Therefore, when switching operation of the pieces 46 and 48 of forceps is carried out, a pin 44 may be worn out and the shank 54 of a pin 44 may break. Since the caulking section 66 side of the pin 44 which broke is stuck to the caulking section 66 by the piece 46 of forceps, it does not drop out of the piece 46 of forceps. On the other hand, since the flange 52 is engaging with the concave slot 56 of a link 40, the flange 52 side of the pin which broke does not drop out of the piece 46 of forceps.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] General drawing of the bioptome of the gestalt of this operation

[Drawing 2] Drawing of longitudinal section of the forceps section of the bioptome shown in drawing 1

[Drawing 3] The cross section which meets three to 3 line of the forceps section shown in drawing 2

[Drawing 4] Elements on larger scale of the forceps section shown in drawing 3

[Drawing 5] The perspective diagram showing the important section of this invention

[Description of Notations]

10 [— A link, 40 / — A link, 42 / — A pin, 44 / — A pin, 46 / — The piece of forceps, 48 / — The piece of forceps, 52 / — A flange, 54 / — A shank, 56 / — Concave slot] — A bioptome, 16 — The forceps section, 38

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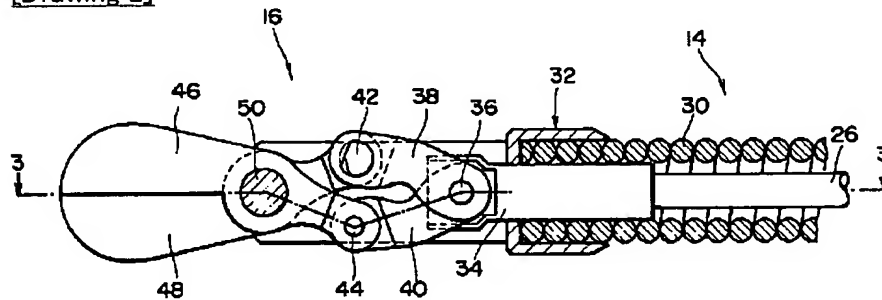
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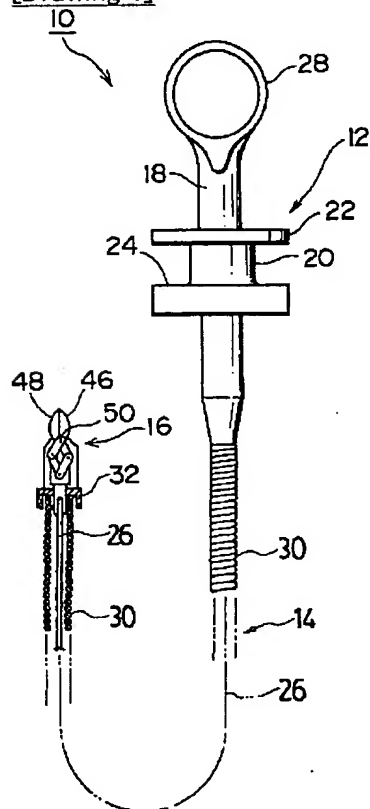
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DRAWINGS

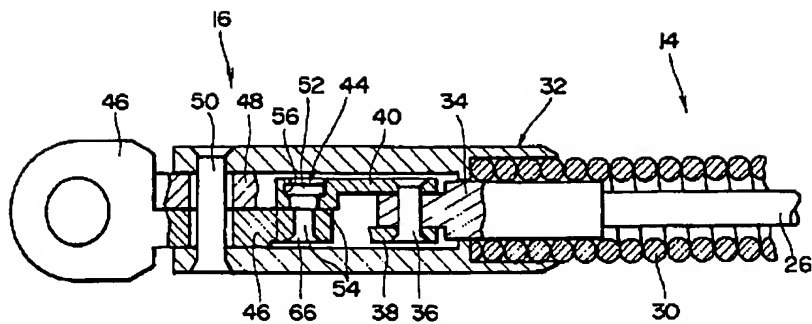
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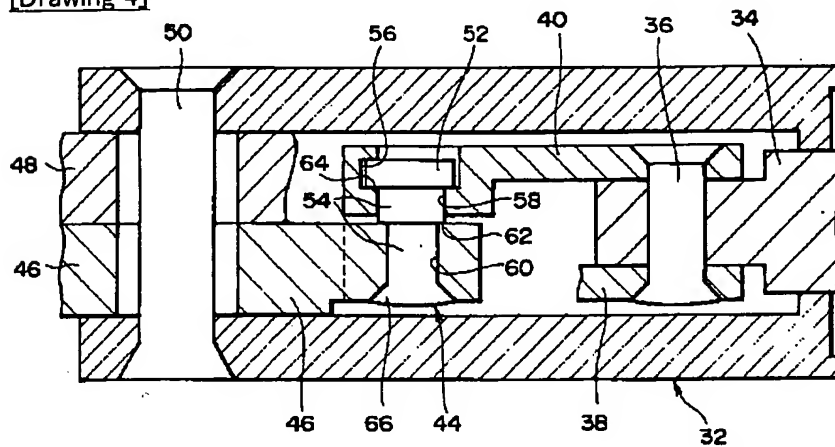
[Drawing 1]



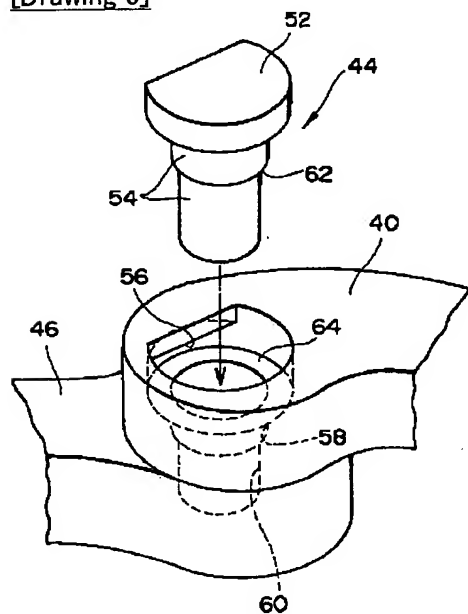
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]